Compliance Testing, LLC
Previously Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

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Test Report

Prepared for: NextLink Video Communications

Model: Starlink Wireless 1525

Description: 2.4GHz Wireless Transmitter

Serial Number: N/A

FCC ID: WPSSL-1525-T8RX1

To

FCC Part 74H

And

IC RSS-123 Issue 2

Date of Issue: March 30, 2016

On the behalf of the applicant:

NextLink Video Communications
9810 E. 2nd Street
Tucson, AZ 85748

Attention of:

Van Sarkiss, CEO
Ph: 520-444-7311
E-Mail: van@nextlinkvideo.com

Prepared by
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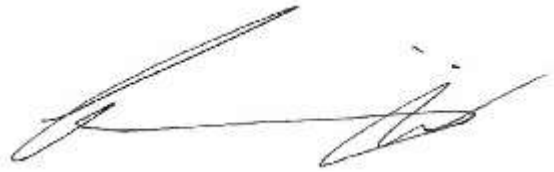
Project No: p1510007



Alex Macon

Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	October 12, 2015	Alex Macon	Original Document
2.0	March 28, 2016	Alex Macon	Updated comments on test summary table
3.0	March 30, 2016	Alex Macon	Updated with emissions designator on page 15

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ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted in the table below.

Please refer to http://www.compliancetesting.com/labscope.html for current scope of accreditation.

Testing Certificate Number: **2152.01**

FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

The Applicant has been cautioned as to the following

15.21: **Information to the User**

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance cold void the user's authority to operate the equipment.

15.27(a): **Special Accessories**

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Test and Measurement Data
Subpart 2.1033(c)(14):

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II, Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057, and the following individual Parts: 74.

Standard Test Conditions and Engineering Practices

Unless otherwise indicated, the procedures contained in ANSI C63.4-2009 were observed during testing.

In accordance with ANSI C63.4-2009, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specified testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (°C)	**Humidity (%)**	**Pressure (mbar)**
24.5 – 25.2	45.1 – 47.2	965.4 – 973.3

EUT Description
Model: Starlink Wireless 1525
Description: 2.4GHz Wireless Transmitter
Firmware: N/A
Software: N/A

Additional Information:
The Starlink Wireless 1525 is a wireless transmitter which transmits in the 2.4GHz range. Its intended use is as a portable means to transmit video.
The EUT was powered by an AC to DC Power supply which accepts 120VAC at 60 Hz. and outputs 12 VDC

EUT Operation during Tests
The EUT was transmitting on 2470 MHz and was modulated using a color bar generator

Accessories:

Qty	Description	Manufacturer	Model	S/N
1	AC to DC Power Supply	StarLink	SL 1550T	N/A

Cables: None

Modifications: None

Manufacturer provided test equipment

Qty	Description	Manufacturer	Model	S/N
1	Color bar generator	3M Brand	210 CB SG	N/A

Test Result Summary

Specification	Test Name	Pass, Fail, N/A	Comments
2.1046(a) 74.861(e)(1)(i) RSS-123 (4.2.1.1)	Carrier Output Power (Conducted)	Pass	
2.1051, 74.861(e)(6) RSS-123 (5.5.1)	Unwanted Emissions (Transmitter Conducted)	Pass	
2.1053 74.861(e)(6) RSS-123 (5.5.1)	Field Strength of Spurious Radiation	Pass	
74.861(e)(6) RSS-123 (5.5.1)	Emission Masks (Occupied Bandwidth)	Pass	
2.1047(a)	Audio Low Pass Filter (Voice Input)	N/A	The EUT does not possess an audio filter
2.1047(a)	Audio Frequency Response	N/A	The EUT does not possess an audio filter
2.1047(b)	Modulation Limiting	N/A	The EUT does not possess an audio filter
2.1055, 74.861(e)(4) RSS-123 (5.4)	Frequency Stability (Temperature Variation)	Pass	
2.1055 RSS-123 (5.4)	Frequency Stability (Voltage Variation)	Pass	

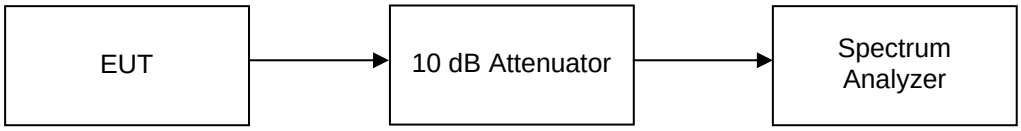
Carrier Output Power (Conducted)
Engineer: Alex Macon
Test Date: 10/6/15

Measurement Procedure

The Equipment Under Test (EUT) was connected directly to a spectrum analyzer. The test cable and attenuator were entered into the spectrum analyzer as a reference level offset before recording the peak conducted output power for the FCC.

RBW = 1 MHz
Video BW = 3 MHz

Test Setup



FCC Transmitter Peak Output Power

Tuned Frequency (MHz)	Recorded Measurement (dBm)	Limit (dBm)	Result
2470	28.45	40	Pass

Conducted Spurious Emissions

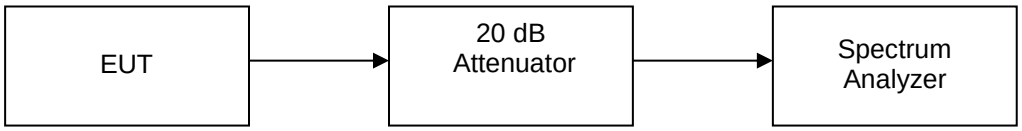
Engineer: Alex Macon

Test Date: 10/12/15

Test Procedure

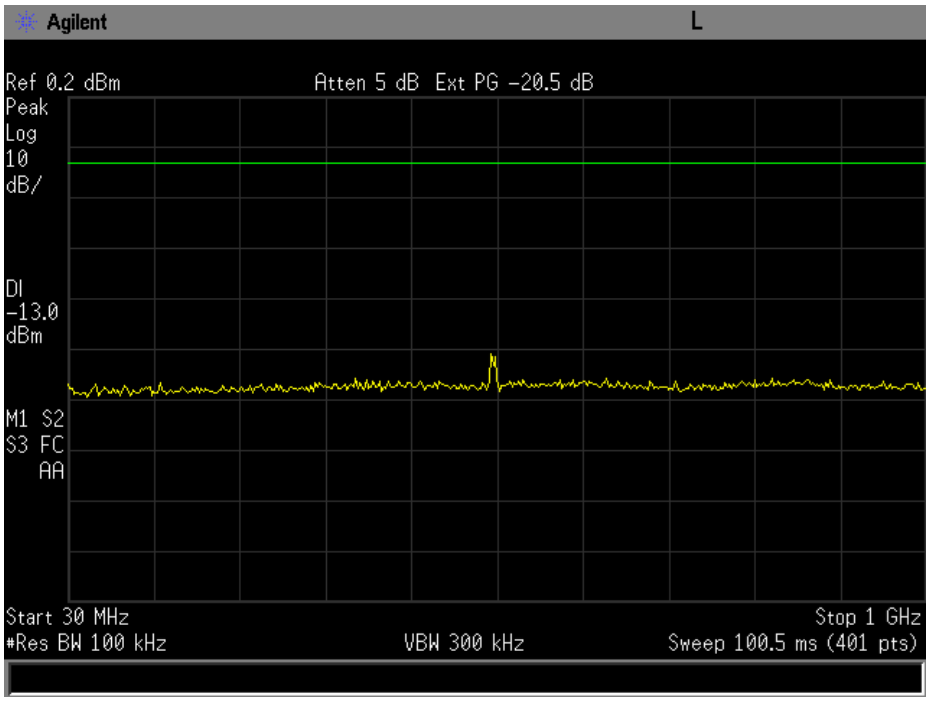
The EUT was connected directly to a spectrum analyzer to verify that the EUT met the requirements for spurious emissions.
The reference level was adjusted to ensure the system had sufficient dynamic range to measure spurious emissions. The frequency range from 30 MHz to the 10th harmonic of the fundamental transmitter was observed and plotted.

Test Setup

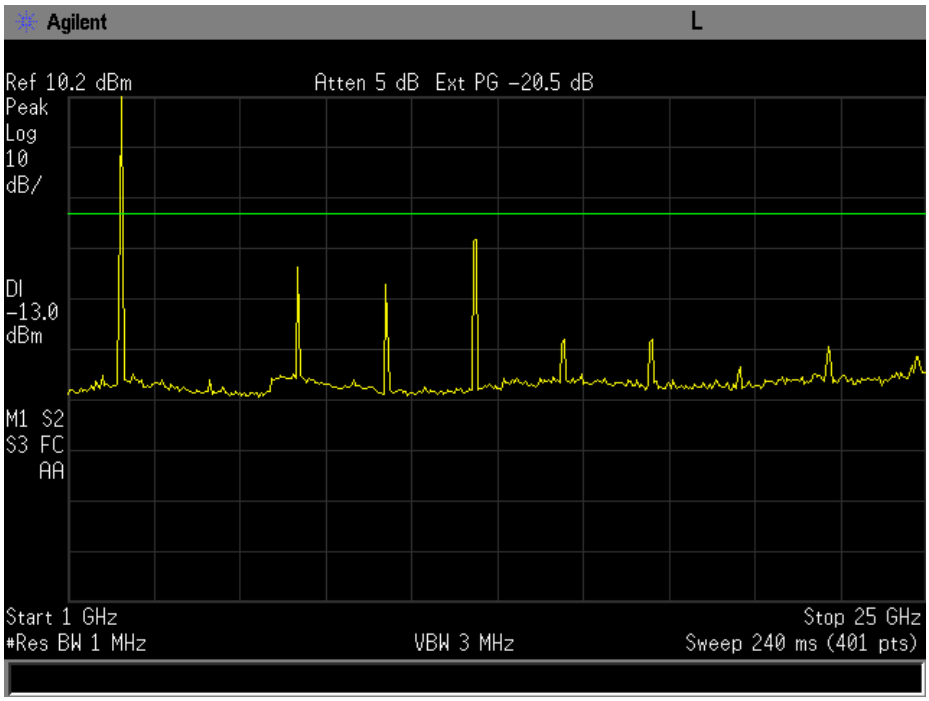


FCC Conducted Spurious Test Plots

Tuned Frequency – 2470 MHz
30 MHz to 1 GHz



1 GHz to 25 GHz



Field Strength of Spurious Radiation

Engineer: Alex Macon

Test Date: 10/6/15

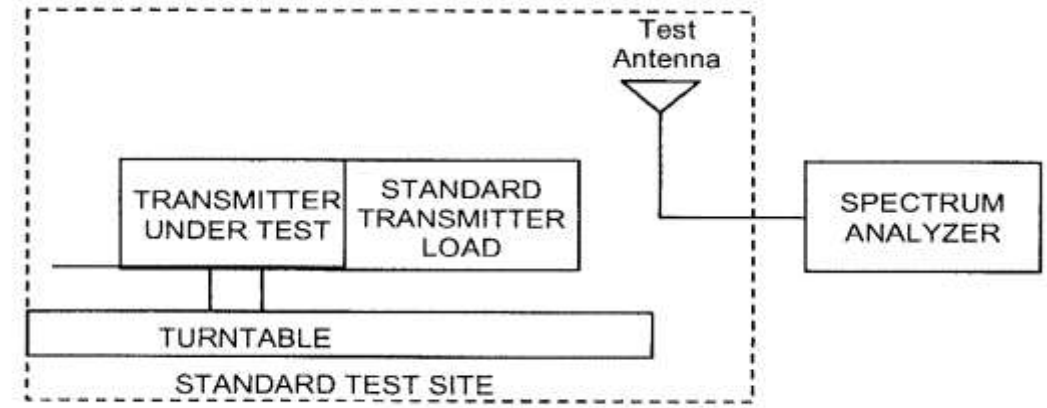
Test Procedure

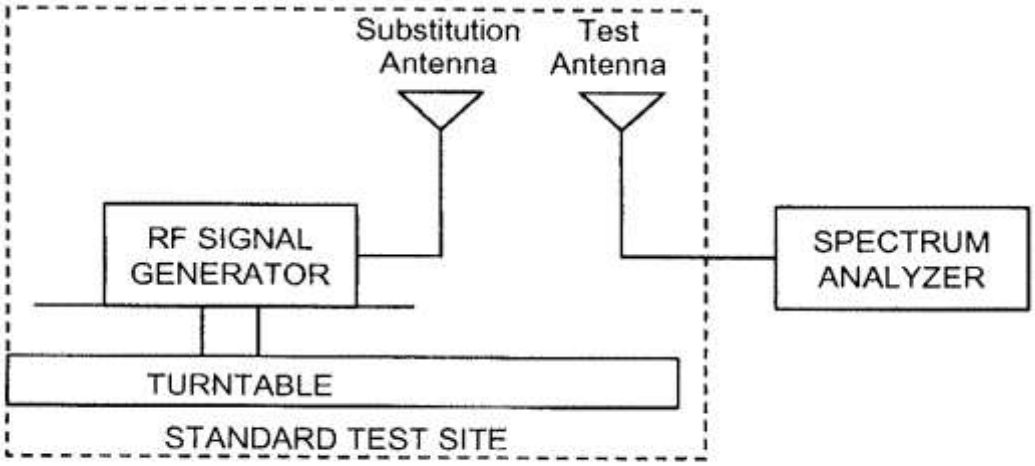
A) Connect the equipment as illustrated
B) Adjust the spectrum analyzer for the following settings:
    1) Resolution Bandwidth 100 kHz (< 1 GHZ), 1 MHZ (> 1GHz) unless otherwise specified.
    2) Video Bandwidth ≥ 3 times Resolution Bandwidth
    3) Sweep Speed ≤2000 Hz/second
    4) Detector Mode = Average
C) Place the transmitter to be tested on the turntable in the standard test site. Transmitters without antennas were transmitting into a non-radiated load. The RF cable to this load should be of minimum length. Transmitters with antennas were transmitting into the manufacturer's supplied antenna.
D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see section 1.3.4.4).
E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.
G) Reconnect the equipment as illustrated.
H) Keep the spectrum analyzer adjusted as in step B).
I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB = $10\log_{10}$ (TX power in watts/0.001) – the levels in step I)

NOTE: It is permissible that the other antennas provided can be referenced to a dipole.

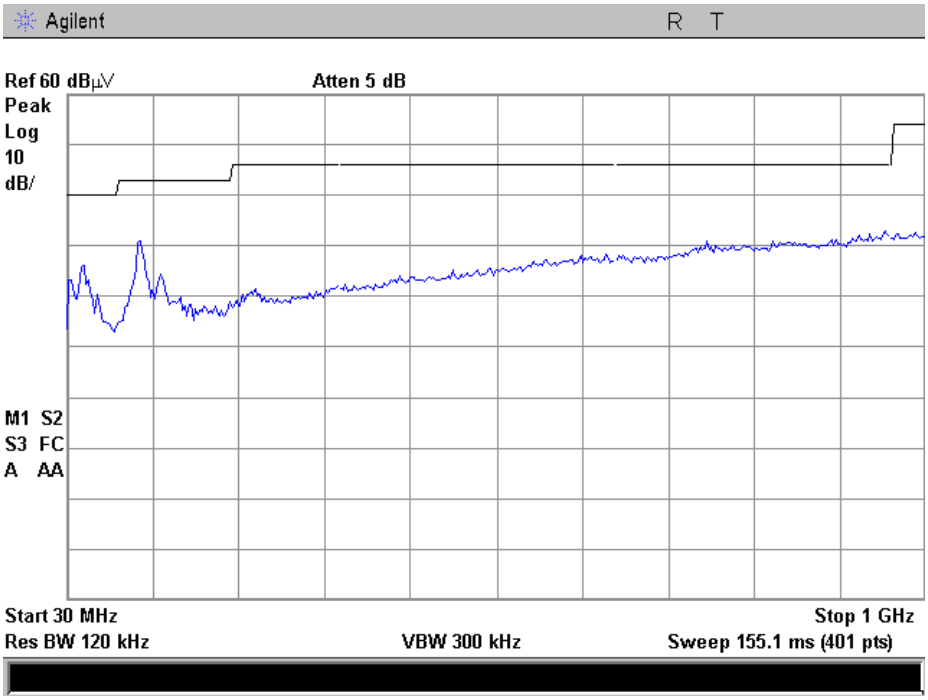
Test Setup


Test
Antenna
TRANSMITTER
UNDER TEST
STANDARD
TRANSMITTER
LOAD
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE

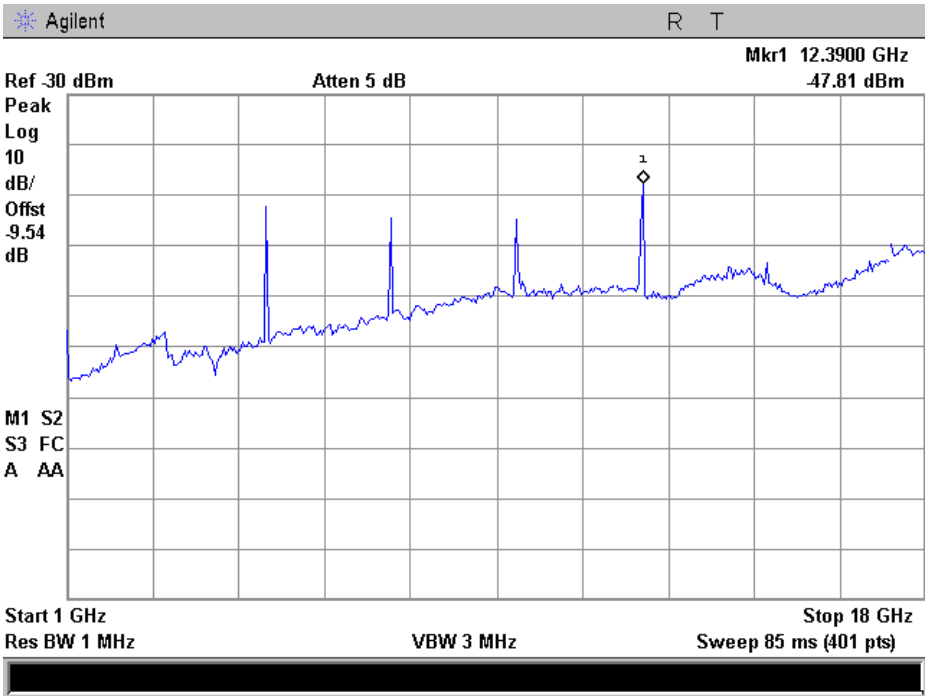

Substitution
Antenna
Test
Antenna
RF SIGNAL
GENERATOR
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE

Test Results

30 – 1000 MHz



1 – 18 GHz



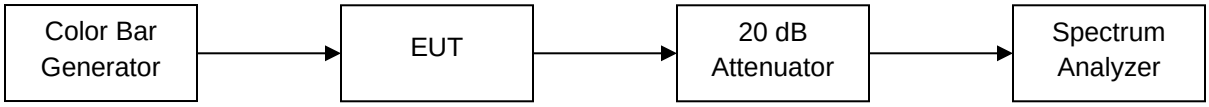
Emissions were investigated up to the 10th harmonic. No other emissions were detected. All emissions were greater than –25 dBm.

Emission Masks (Occupied Bandwidth)
Engineer: Alex Macon
Test Date: 10/6/15

Test Procedure

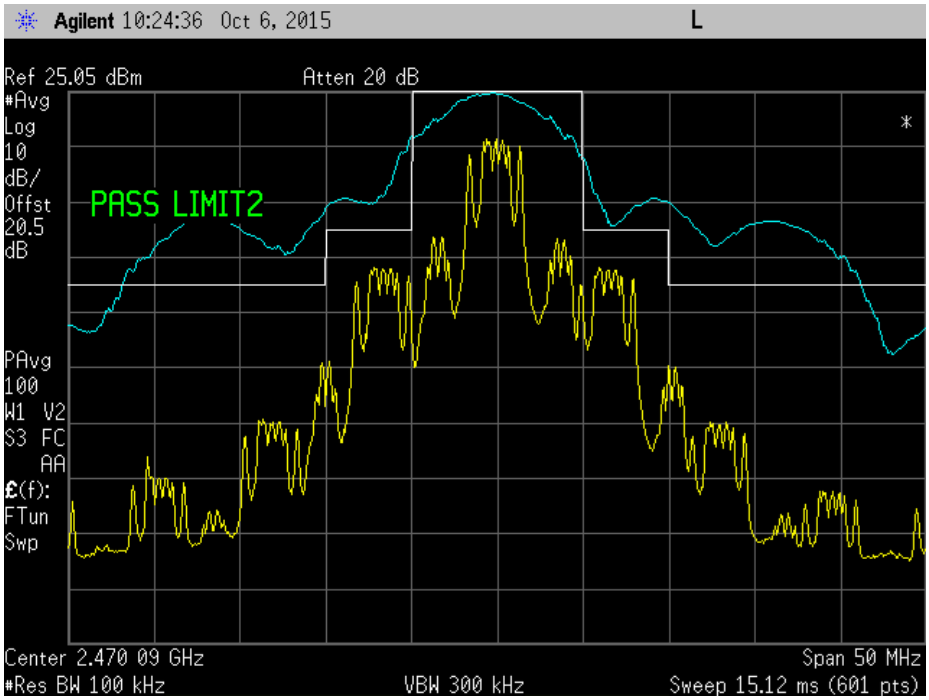
The EUT was connected directly to a spectrum analyzer to verify that the EUT meets the required emissions mask. A reference level plot is provided to verify that the peak power was established prior to testing the mask.
A constant video signal was supplied to the device to modulate the carrier.

Test Setup

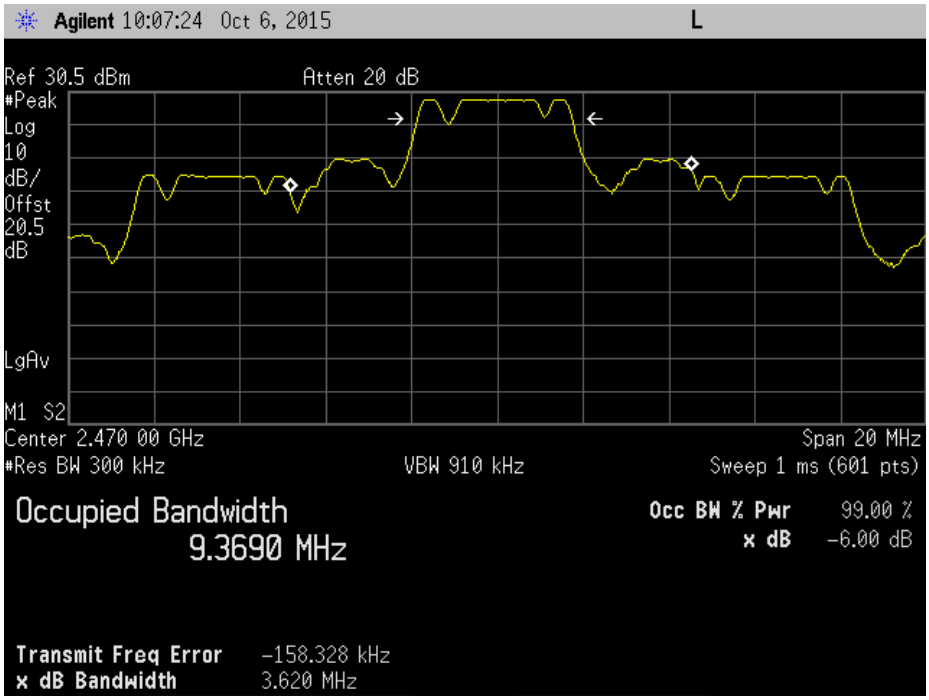


Emission Mask Test Data

9M36F3W



99% Occupied Bandwidth Test Data



Frequency Stability (Temperature Variation)

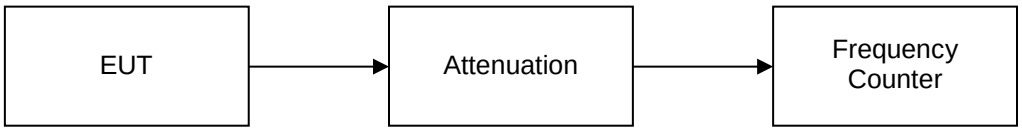
Engineer: Alex Macon

Test Date: 10/7/15

Measurement Procedure

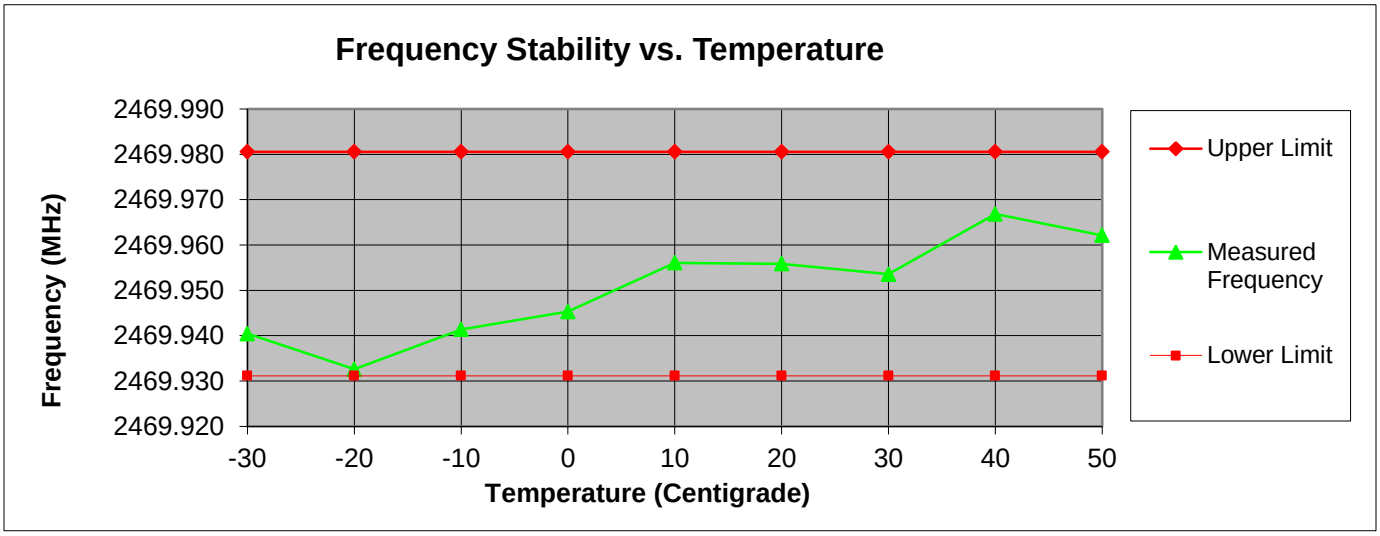
The EUT was placed in an environmental test chamber and the RF output was connected directly to a frequency counter. The temperature was varied from -30°C to 50°C in 10°C increments. After a sufficient time for temperature stabilization the RF output frequency was measured.

Measurement Setup



Measurement Results

Tuned frequency: 2469.9558594 MHz
Lower Limit: 2469.9311598MHz
Upper Limit: 2469.9805590 MHz



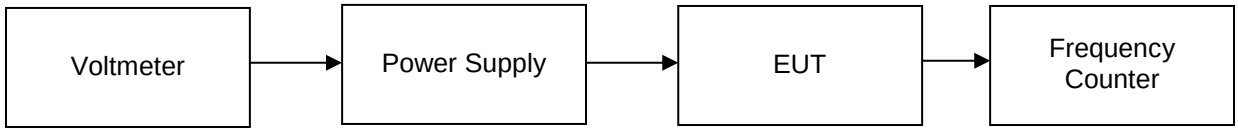
Frequency Stability (Voltage Variation)
Engineer: Alex Macon
Test Date: 10/7/15

Measurement Procedure

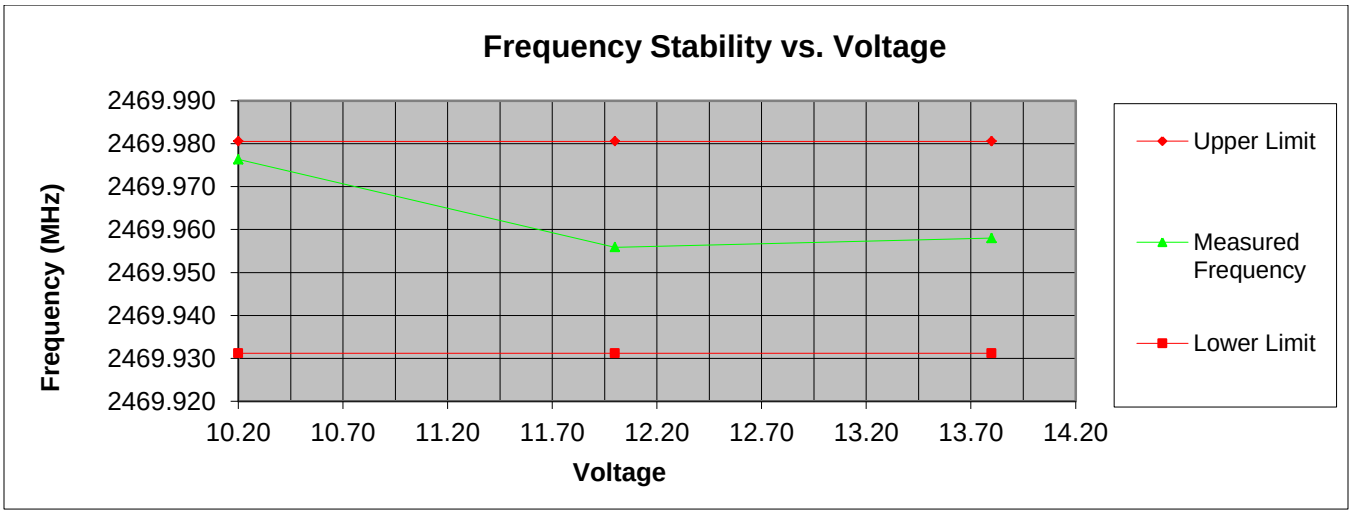
The EUT was placed in a temperature chamber at 25±5°C and connected directly to a frequency counter and variable power supply. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value and the RF output was measured.

Tuned frequency: 2469.9558594 MHz
Lower Limit: 2469.9311598MHz
Upper Limit: 2469.9805590 MHz

Measurement Setup



Measurement Results



Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Temperature Chamber	Tenney	Tenney Jr	i00027	Verified on: 10/7/15	
High Pass Filter	Trilithic	4HX3400-3-XX	i00177	Verified on: 10/6/15	
Bi-Log Antenna	Schaffner	CBL611C	i00267	2/24/14	2/24/16
Horn Antenna, Amplified	ARA	DRG-118/A	i00271	5/8/14	5/8/16
Horn Antenna, Amplified	ARA	MWH-1826/B	i00273	4/22/15	4/22/18
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	4/1/15	4/1/16
Voltmeter	Fluke	75III	i00320	3/24/15	3/24/16
Spectrum Analyzer	Agilent	E4407B	i00331	9/18/15	9/18/16
Data Logger	Fluke	Hydra Data Bucket	i00343	3/24/15	3/24/16
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	10/8/13	10/8/15
EMI Analyzer	Agilent	E7405A	i00379	2/5/15	2/5/16
Power Supply	Yihua	PS 3010D	i00409	Verified on: 10/6/15	
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	11/26/13	3/12/16
PSA Spectrum Analyzer	Agilent	E4445A	i00471	8/26/15	8/26/16

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT